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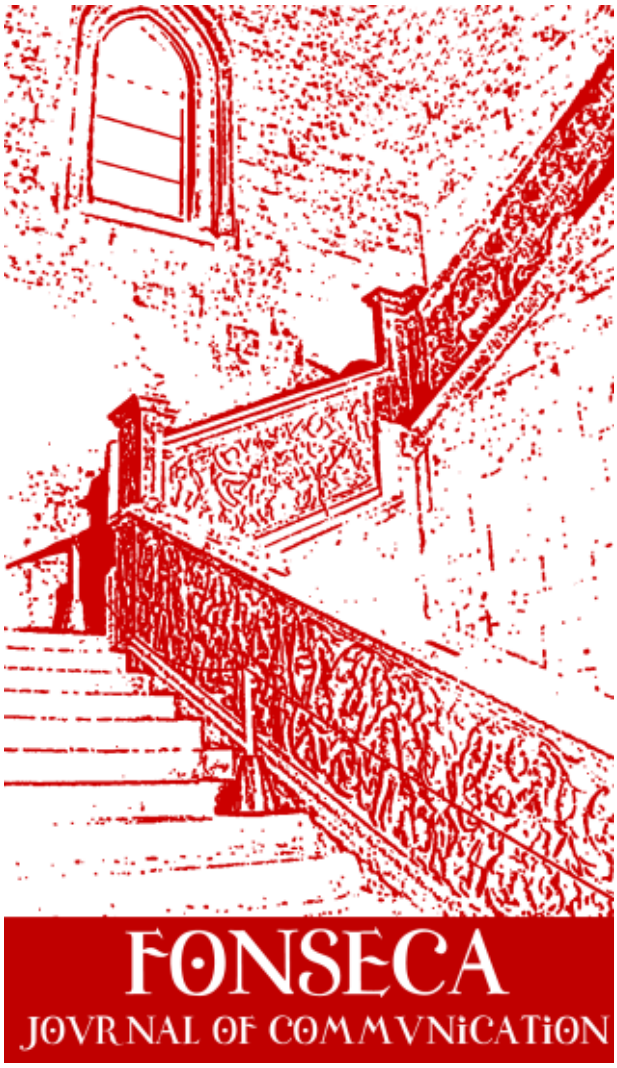
Around the Magic Lantern World in Eighty Setting



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AROUND THE MAGIC LANTERN WORLD IN EIGHTY SETTING [1]

La vuelta al mundo de la linterna mágica en ochenta vistas

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ABSTRACT

Although the magic lantern developed a prosperous equipment industry and satisfied a varied consumer demand based on the development of very sensible expressive systems, its study has been left out of the academic curriculum in the history of mass media. The fact that the sources and documentation concerning magic lanterns are widely scattered has been an obstacle for their systematic study. Both their long history –over three centuries- and the controversy in historical interpretation caused by locating them under the term 'precinema' have meant that they lack a conceptual definition. This in turn has been a hindrance for considering magic lanterns as an important research subject.

Key words: Magic lantern, History of communication, Audiovisual heritage, Mass media, Daily life, Contemporary culture.

RESUMEN

Aunque la linterna mágica desarrolló una próspera industria de equipos y satisfizo una variada demanda de prácticas de consumo, a partir del desarrollo de sistemas expresivos llenos de sentido, su estudio ha estado fuera de la planificación académica de la historia de los medios de comunicación. La dispersión de los fondos patrimoniales de la linterna mágica y su indefinición conceptual como objeto de estudio –tanto por la amplitud cronológica de su historia, que discurre entre los siglos XVII y XIX, como por la controvertida interpretación que la adscribe al término 'precine'- son razones que explican como la linterna mágica es todavía un medio de comunicación social en la sombra y que están en el origen del presente acercamiento que tiene como objeto un viaje elíptico y sistemático –articulado en torno a cuatro actos, doce escenas y ochenta vistas- por el universo de las proyecciones audiovisuales anteriores al cine.

Palabras clave: Linterna mágica, historia de la comunicación, patrimonio audiovisual, medios de comunicación, vida cotidiana, cultura contemporánea.

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1.- Prologue [1st]

The magic lantern was an audiovisual medium based on the projection of images and the synchronic use of sounds that gained significant cultural transcendence between the 17th and 20th centuries. Its history began with the development of 'representative magic', that is, with the 18th century application of a series of physical principles that allowed images to be projected (First act). In the following century, the magic lantern emerged as a device that became consolidated (Second act) and institutionalised (Third act) as a means of communication in the first three quarters of the 19th century. After its industrialisation and commercialisation in the last quarter of that century (Fourth act), it fell into decline during the first decades of the 20th century.

1st act. The emergence of optical devices (17th -18th centuries) [2nd]

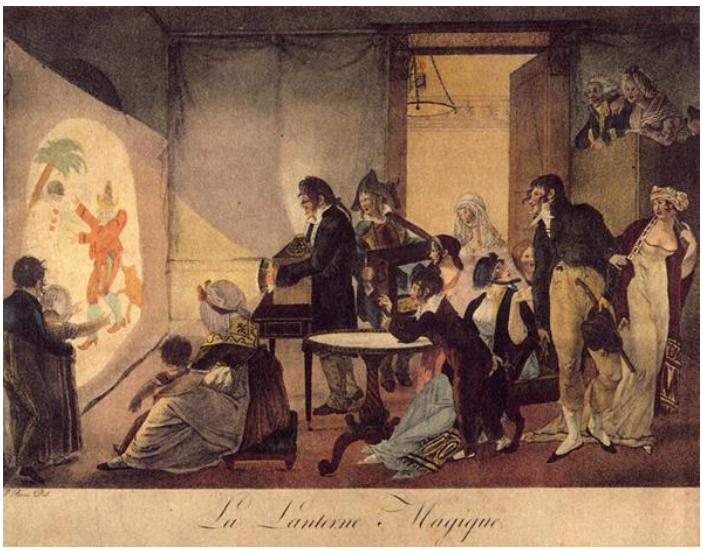
In 1734, the Spanish Royal Academy's 'Dictionary of Authorities' introduced the Spanish word for "magic lantern" with the following definition:

> A catoptric-dioptric machine, devised not only for people's enjoyment, but also to show the excellence of the art. It is a box of tin or any other metal, where a light is hidden in front of a concave mirror, opposite which there is a barrel with two convex lenses and the light passing through them forms a circle of light on the white wall it is aimed at. If you introduce between the light and the lenses some tiny figures, painted on glass or traced in transparent colours, you can see them represented perfectly on the wall, in a much greater size, which can be increased or reduced as one wishes by lengthening or shortening the barrel (Diccionario de Autoridades de la Real Academia Española, 1734, pp. 413-414).

1st scene. The first itinerant projections [3rd]

In spite of the difficulties involved in reconstructing audiovisual culture prior to the 19th century, we have testimony that shows how public magic lantern sessions proliferated in Europe. Hardly any magic lantern images have survived from the second half of the 17th century and the last quarter of the 18th century. The images from this period were crudely or irregularly drawn on plates cut out of thick glass with slight waves and small air bubbles on the surface. Caricatures, landscapes and scenes of hunting or gallant love were some of the favourite motifs of the time.

Figure 1. 1804. J.F. Bosio. La lanterne magique (Crangle, Herbert & Robinson., 2005, p. 71)



1st scene. The first written testimony [4th]

Charles Patin, in his 'Relations historiques et curieuses de voyages' (1674), offers one of the first testimonies of the experience of attending a magic lantern session:

> An art that can place half the world on a point; that has solved the way visual echoes arise out of glass and the way to bring closer objects that are far away through the reproduction of things and the correspondences of images, which extend the most infinite distances in the most limited spaces. This deceptive art outwits our eyes, and with the ruler and the compass upsets all our senses (Mannoni, 1994, p. 90).

1st scene. Magic lantern images as historical and social documents [5th]

Important social acts such as battles, balls, parades and coronations were some of the other typical motifs appearing on the slides for the magic lantern throughout the 18th century. In 1772, for example, Benjamin Martin, a British author of books popularizing science, alluded to a magic lantern session which projected images of a coronation in his work 'The Young Gentleman and Lady's Philosophy': this surely was in reference to either the coronation of George II in 1727 or that of George III in 1760 (Mannoni, 1994, pp. 98-99).

1st scene. References to magic lantern slides that no longer exist [6th]

Written references have been found in document sources about magic lantern slides that have not been preserved, such as those from the gallant sessions organized by Philip of Orleans, the French regent from 1715 to 1723. The images illustrated 'I ragionamenti', a comedy by the Italia writer Pietro Aretino, and they were projected by the Marquis Charles Auguste de la Fare, using a lantern he himself had built. With respect to the show, the Marquis offered this curious testimony:

> Taking advantage of the darkness needed for the show, everyone began to put their hands on a woman; I myself wanted to send mine to the lady who was next to me, but wherever I tried to touch her I found the territory already occupied by the fingers of others (Mannoni, 1994, p. 95).

1ST scene. Suspicious images [7th]

Testimony exists regarding how the itinerant magic lantern sessions must have seemed too coarse for nobility that moreover was suspicious of their messages. In Spain in 1790, the erudite Gaspar Melchor de Jovellanos, in his work 'Espectáculos y diversiones públicas en España', gives evidence of the mistrust of this kind of show by suggesting that "perhaps the puppets and jack puddings, the amusing harlequin clown marionettes, the magic lanterns and cosmoramas and the other inventions that, although innocent in themselves, are depraved and corrupted by their clumsy blunders [...] should disappear" (De Jovellanos, 1967, p. 117).

2nd scene. The first itinerant lanternists [8th]

The lanternist was the person in charge of showing the images during a magic lantern session. This figure is central to understanding the magic lantern as a means of social communication. As a solitary itinerant artiste –in the 17th century- or as part of a group of professionals –end of the 19th century- this figure was the key to maintaining the attention of the audience since he was responsible for the simultaneous staging of the images projected by the magic lantern, the reciting of texts or the playing of a melody. The itinerant lanternists, know in all of Europe as Savoyards –since according to popular rumour they came from the French region of Savoy– are usually represented with a magic lantern, accompanied by a small monkey, a hurdy-gurdy, and even children or a whole family. The Savoyards offered their shows to spectators who for the

most part were illiterate, during night time street spectacles, or in taverns, inns or homes.

Figure 2. 1800. Savoie (Robinson, 1997, p. 4)

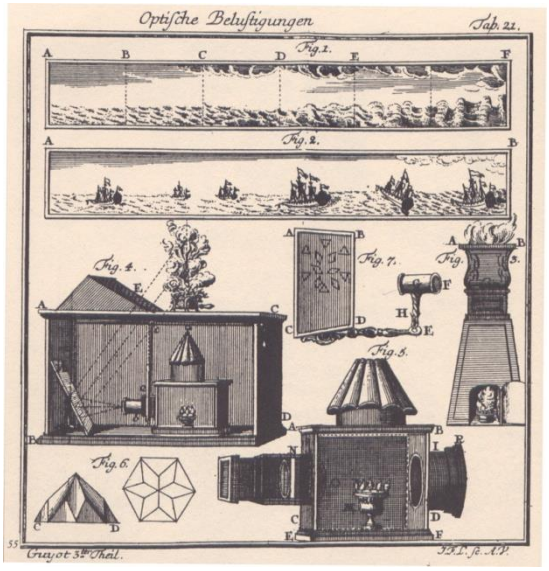
2nd scene. The lanternist's craft [9th]

Although it would be hazardous to affirm what methods these picturesque figures used during the first half of the 18th century, we know that in the second half of that century the lanternist was a recognized and perfectly differentiated craft, but one with low social standing. Hence it is not surprising that in 1753, when the painter Christoph Huet drew a whole series of motifs inspired by popular occupations and destined to decorate pieces of porcelain, he included the lanternist among those of "the lowest condition", along with the lamp bearer, vinegar maker, itinerant cook, rolled wafer seller, or beggars. In spite of the difficulties involved in reconstructing audiovisual culture prior to the 19th century, we have testimony that shows how public magic lantern sessions proliferated in Spanish territory. In Madrid alone, as from the middle of the 18th century, mention is made in the press of a good number of people devoted to lanternism. For example, Francisco Callejo had "a very particular and uncommon magic lantern, as it gave out a light in an oval of almost 18 inches, in which we see beautiful perspectives of gardens, temples, marinas, hunts, beasts, and such strange figures as to move the eyes" (Diario Noticioso, 12-5-1759).

3rd scene. The emergence of the first projection devices [10th]

The main obstacle to the emergence of the magic lantern was the design and construction of its optics. During the 18th century, the contributions of scientists from Great Britain, Germany, Holland, Italy and France provided the definitive boost needed for the technological development and subsequent popularization of this magical device.

Figure 3. 1770. E.G. Guyot. Nouvelles récréations physiques et mathématiques (Robinson, 1993, p. 28)



3rd scene. The invention of the magic lantern [11th]

Nowadays, the invention of the magic lantern is attributed to the Dutch astronomer, physicist and mathematician Christiaan Huygens, who in 1659 drew the first magic lantern next to the description of the rudimentary telescope with which he discovered the rings of Saturn. The original is preserved in the library of the University of Leiden and appears published in Volume XXII of his 'Complete Works', edited by the Société Hollandaise des Sciences, between 1888 and 1950, in The Hague.

3rd scene. Huygens' macabre figures [12th]

The first preserved and verified document source that describes a magic lantern appears in Huygens' 1659 manuscript cited earlier and is made up of ten macabre figures that would have served as sketches for making an animated slide, employing

the simple method of superimposing two plates of glass: one immobilized, representing the skeleton without the cranium or the right arm, and the other mobile, with the drawing only of the skull and the arm.

3rd scene. The marvellous lamp of Giovanni de Fontana [13th]

Other document references prior to Huygens sketches can be traced, but they cannot be verified. One example is the engraving that appears in 'Liber Instrumentorum' *(1420)*, by Giovanni de Fontana. In the illustration it is not possible to know whether the human figure is holding a lamp or a magic lantern, although next to the artefact is the image of a devil.

3rd scene. The 'Kircher hypothesis' [14th]

Classic authors such as Millingham (1945), Ceram (1965) and Staehlin (1981) maintained that Athanasius Kircher invented the magic lantern. According to this hypothesis, starting in the middle of the 17th century Kircher customarily used the projection of images in his classes at the Jesuit Centre for Higher Studies in Rome. The problem of demonstrating this with documents is that the first description of a magic lantern does not appear in Kircher's work, 'Ars magna lucis et umbral', until its 1671 edition.

3rd scene. The magic of *Las Meninas* [15th]

In line with the conjecture that links Kircher with the use of the magic lantern beginning in the middle of the 17th century, other hypotheses have been proposed that relate important personages of that time with the magic artefact. Thus, Ángel del Campo Francés suggests in his work 'La magia de Las Meninas' (1978) that the painter Diego Velázquez could have known about Kircher's magic lantern when he travelled to Rome, and he argues quite convincingly that this instrument would explain the appearance of King Philip IV and Queen Isabella in the mirror of the famous painting 'Las Meninas', which was painted in 1656. According to this idea, the painting would be showing a magic lantern session organized by Velázquez in his quarters.

3rd scene. The prototypes [16th]

Hardly any examples of magic lanterns have been preserved from those first decades of its history. Nonetheless, it is possible to deduce, based on engravings from the time, their simple craftsmanship and character as a prototype that made them practically unique. Built with lightweight materials such as wood or sheet metal, the magic lantern and its slides were designed to be transported inside boxes that during the session served as a pedestal. Thanks to the fabrication of ever more flawless and more transparent lenses, the great obstacle of projection quality was overcome and an image without deformations was achieved, equivalent to what was drawn on the glass.

3rd scene. Sturm's Megalographic Lantern [17th]

In Germany, the physicist Johann Christoph Sturm included a magic lantern in his work 'Collegium experimentale, sive curiosum' (1676), next to all kinds of physical-mathematical inventions and together with a portable camera obscura. This lantern received the curious name "dioptric-catoptric" or "megalograph", and its function was to enlarge the small figures that were placed inside it. In this same work, Sturm also published the first printed graphic representation of a complete fixed slide: a splendid head of Bacchus, smiling and covered in bunches of grapes, painted on a 5 cm. circle of glass and mounted on a rectangular wooden structure.

3rd scene. The contributions of Johannes Zahn [18th]

In 1685, the German Johannes Zahn used for the first time a non-rectangular glass base when he arranged a series of images around the edge of a disc. Zahn also applied the magic lantern to unusual purposes, such as the connection of a projector to a weather vane on a rooftop, to build a kind of automatic anemograph.

3rd scene. Rhanaeus and the scientific dignity of the magic lantern [19th]

In 1712, Samuel Johannes Rhanaeus defended in the Italian University of Jena the scientific dignity of the magic lantern as a subject of research in a paper that posed its educational possibilities and its application to natural history, sacred history, geography and mathematics.

3rd scene. Towards the popularizing of the magic lantern [20th]

At the end of the 18th century, being able to directly witness the magic of the lantern was becoming easier and easier. At least that is what Jean Antoine Nollet affirms in lesson XVII of his famous 'Lessons in Experimental Physics', published in 1757: "Nowadays the magic lantern is one of those instruments that have become ridiculous owing to the excessive fame and applause that they have merited. It is passed through the streets for the fun of the populace and the children: which, together with its name, is proof that its effects are curious and admirable" (Nollet, 1757, p. 364).

3rd scene. The first magic lantern slides [21st]

Magic lantern slides, usually made of transparent glass, were the soul of any projection. Made by the lanternists themselves, their images illustrated a range of topics, from fables and fairy tales to allegorical, religious and comic themes and current events. As to their material aspect, these early slides usually had a circular format – with the images around the perimeter of a glass disc- or a rectangular format, which, being much longer horizontally than vertically has several images painted lengthwise.

3rd scene. The pictorial technique used on magic lantern slides [22nd]

Painting magic lantern scenes required the command of a difficult technique, since the projection magnified the slightest error in design. From the very beginning craftsmen preferred water colour to oil paint because of its transparency. The images they wished to project with the lantern were first drawn on paper and then copied onto glass. When the process was finished, the chosen colour was applied inside each silhouette. A caption could also be written on the background using a needle or a paintbrush. Finally, everything was covered with a clear varnish to protect the paintings from damp and heat.

3rd scene. Slides with transformation techniques [23rd]

As early as 1779, Edme-Gilles Guyot in his work, 'Nouvelles récréations physiques et mathématiques', described numerous slides in a linear format with transformation motifs, such as a woman putting on and taking off a mask; two men hitting a stone; a carpenter who is planning wood and two ships crossing the sea. This type of slide was very popular with audiences throughout the entire history of magic lantern shows.

3rd scene. Incidental music in the origins of the magic lantern [24th]

Pictures of itinerant lanternists from the first era of projections almost always include some kind of musical instrument: a hurdy-gurdy, a music box, a guitar or a drum. These instruments undoubtedly served to attract members of the audience before the show began and for musical accompaniment during the show. In illustrations showing domestic projections one can usually glimpse some type of incidental music.

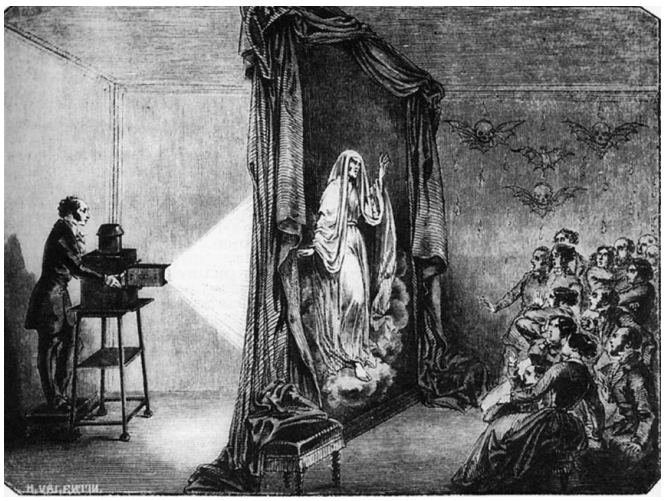
2nd act. Phantasmagoria and the consolidation of the magic lantern as public specatacle (1800-1840) [25th]

Phantasmagoria sessions set up a specific way of structuring the audiovisual tale that allows them to be grouped together and differentiated from the rest of the magic lantern sessions. By acting as a factor in the recognition, identification and reading of projections, the term ‘phantasmagoria’ served as a guide for the expectations of the audience. Thus, audiences at the beginning of the19th century began to identify the term with a specific audiovisual show which nonetheless still managed to surprise them.

4th scene. Phantasmagoria sessions [26th]

A simple comparison of the staging or contents of an 18th century magic lantern projection with the phantasmagoria session is enough to understand why the latter took to its limits a new way of understanding audiovisual spectacles. It was a spectacle in its own right which combined with great scenic and narrative agility themes from the Old Testament, literature and mythology with others of a more trivial nature inspired in comedy, fantasy, moralizing or current affairs.

Figure 4. 1849. H. Valentin (Robinson, 1993, p. 55)



4th scene. Death as a source of inspiration [27th]

Represented by skeletons, sepulchres, mortuary masques, or cemeteries, death was one of the main sources of inspiration for phantasmagoria sessions. The scenes evoked the mysterious atmosphere of gothic novels and were all the rage in the closing stages of the 18th century: ruins bathed in moonlight, cemeteries with bats flying through and cloisters in which novices appear looking for a lost lover.

4th scene. Monstrous and mythological creatures [28th]

In the thematic universe of phantasmagoria sessions we can find demons and devils, wolf ears, fangs of wild boar, bat wings, claws and fetlocks that grow on the bodies of both men and women: hybrid and monstrous creatures that mingled with mythological figures such as a Medusa head or a winged griffin.

4th scene. The representation of human beings [29th]

Human beings, except in cases of great personages, were usually represented by men as monks or hermits. The women were virgins, novices, nuns, witches or fortune tellers. These were motifs that managed to please spectators time and again, as seen in the systematic inclusion of phantasmagoria sessions in the magic lantern evenings offered throughout the entire 19th century.

5th scene. The lanternist as master of ceremonies [30th]

The figure of the lanternist in the context of the phantasmagoria session can be compared to that of a 'master of ceremonies' who subjected his 'faithful' audience to disconcerting visual experiences. Their narrative function in the spectacle took on great importance: transformed into authentic narrators, their sporadic commentary summarized key aspects for understanding the visual tale, or they expressed value judgements, maxims or reflections.

Figure 5. 1840. H. Meyer. La linterne magique, Chason chantée par Mme Kaiser à l'Alcazar d'Hiver. (Robinson, 1993, p. 53)

5th scene. Robertson's Phantasmagoria [31st]

Étienne-Gaspard Rober, known as Robertson, was a priest who went astray and was interested in magic, physics, and aeronautics. Born in Liege in 1763, Robertson managed to integrate two conditions of knowledge and communication: that of mediaeval cleric and that of baroque playwright. Whereas we are unaware of the importance and even the identity of many lanternists of this time, Robertson's work appears well documented in 'Mémoires récréatifs, scientifiques et anecdotiques', a titled autobiography written between 1831 and 1833, in which he left testimony of the 1798 debut in Paris of his phantasmagorias, sessions with slight variations that were offered throughout three decades in the French capital and in other European cities such as Berlin, Prague or Madrid.

5th scene. Robertson in Madrid [32nd]

Robertson's phantasmagorias was offered in Madrid, in the Teatro del Príncipe, between 24 January and 25 February, 1821. Their impact on the public has been perfectly documented by researchers such as Varey (1995), Müller (1984) and Bird (2003). Müller and Bird even went so far as to defend a direct relation between phantasmagorias and the Black Paintings of Francisco de Goya, works he painted coinciding with the stay of the French lanternist in the Spanish capital.

5th scene. Other authors of phantasmagoria [33rd]

News of the different sessions of phantasmagoria soon proliferated throughout Europe and North America. In Great Britain, for example, Philipsthal brought out his spectacle, 'Phantasmagoria', in 1801 in the Lyceum Theatre in London, and a year later, the Italian Guglielmus Federico exhibited 'The Phantasmagoria' throughout all of Great Britain. In 1803 there was already documentary proof of a phantasmagoria attraction in the United States. In Spain, in the middle of Spanish War of Independence, Juan González Mantilla was highly successful with "The Illusions of Phantasmagoria", in which appeared "spectres, skeletons, ghosts, portraits of famous men" (Diario de Madrid, 6-1-1810).

6th scene. The artefacts of phantasmagoria [34th]

The systematic use of the phantoscope, the combined projection of dynamic views and opaque objects and the use of musical orchestration such as Franklin's harmonica were the main material elements that determined the consolidation of the new scenic proposal of phantasmagoria.

Figure 6. 1850. Illustration showing a fantascope catalog Carpenter&Westley (Robinson, 1993, p. 56)

6th scene. The phantoscope [35th]

The high visual dynamism characteristic of the phantasmagoria was possible thanks to the phantoscope. Situated behind the screen, the artefact was built of a magic lantern mounted on a stand with wheels that was approximately 160 cm. high. The phantoscope could be moved closer to and away from the screen silently, making it possible to increase or decrease the size of the projected images without the public being aware of the manoeuvre. Furthermore, by means of an ingenious system of shutters and exchange of slides, the spectres could be seen to appear, disappear or move freely about the screen.

6th scene. 'The Drum of the Dead': An emblematic slide by Robertson [36th]

Robertson made famous the view called 'The Drum of the Dead', a slide that helps us to understand how the phantasmagorical images managed to surprise with their audiovisual effects. Robertson himself described in his memoirs the complete scene, which began with a coloured and indeterminate shiny patch on the screen. As the phantoscope was silently pulled back, the image representing Medusa's head grew bigger, until it came sharply into focus and reached the largest size possible. The manoeuvre was reversible, until there was just an indeterminate shine again.

6th scene. The projection of opaque objects [37th]

Phantasmagoria sessions also employed the projection of opaque objects through the use of bas-reliefs, engravings or figures not larger than 30 cm. These objects were then arranged on small boards and placed inside the light box of the phantoscope.

6th scene. Sound effects in phantasmagoria [38th]

Robertson left evidence in his memoirs of the systematic use of musical orchestration such as Franklin's harmonica or the Chinese tam-tam to strengthen impressions in his phantasmagoria. According to Robertson, the terror achieved with 'The Drum of the Dead' was greatest when the optical effect of enlarging and reducing the image of the Medusa was combined with the internal movement of her eyes and the use of the Chinese tam-tam, since, according to the myth, the Medusa could turn to stone anyone she gazed upon.

3th act. The institutionalization of the magic lantern as a means of communication (1840-1880) [39th]

After occupying all social contexts, between 1840 and 1880 the magic lantern became an exceedingly versatile means of communication. The British builder, Charles A. Parker, summarized its qualities as follows:

> There are few scientific instruments calculated to entertain and instruct better than the optical lantern. It can be said that while other instruments such as the microscope or the telescope only attract the educated eye, the effects of the lantern are such that they can be appreciated and understood by large numbers of people at the same time (Parker, 1890, p. 19).

7th scene. Between instruction and entertainment [40th]

The programme 'Theatre of the Illustrated Sciences' by the French lanternist François Moigno, which appears in his work 'L'art des projections' (1872), summarizes and exemplifies the complexity reached by the magic lantern session of the age:

> Musical overture, interpreted on the organ, piano or harmonium. A review of novelties, pictures projected with electric light. A demonstration of illustrated science. Intermission, approximately a quarter of an hour.

> Review of history or geography. Projection of a certain number of pictures. Bouquet. The show will end with optical toys, phantoscope, chromotrope, et cetera (Mannoni, 1994, p. 271).

Figure 7. 1825. Proscenium of the English Opera House in Strand (Crangle, Herbert & Robinson., 2005, p. 91)

7th scene. A delighted audience [41th]

Magic lantern attractions managed to institutionalize a model of recreational and educational public spectacle that for decades occupied cultural spaces such as the Royal Polytechnic Institution in London or those fostered by the initiative of the French lanternist François Moigno.

7th scene. Literary adaptations [42th]

The repertory of views for magic lantern sessions adapted all kinds of themes from the popular tradition, such as proverbs, stories, legends or moral fables. It also did the same with accounts of historical events, or classic printed literary works such as the poem 'The Lady of the Lake' (1810), by Walter Scott, or 'The Story of Gabriel Grub or The Goblins Who Stole a Sexton' (1837), by Charles Dickens.

7th scene. Dissolving pictures [43th]

Dissolving pictures were a type of view that simulated the linking in time of two or more moments of a scene by means of an almost imperceptible visual transition. The

projection was achieved by darkening an image while at the same time superimposing the next image on it and gradually adding more light. Crangle, Herbert & Robinson, authors of the 'Encyclopaedia of the Magic Lantern' (2001, pp. 64-65), attribute the perfecting of dissolving pictures to the Englishman Henry Langdon Childe around 1840, at the Royal Polytechnic Institution, using a set of two lanterns and the extraordinary views painted by W. R. Hill.

7th scene. The hypnotic effect of the chromatoscope [44th]

Invented by the English lanternist, Henry Landon Childe, in 1844, the chromatoscope was a view for magic lanterns capable of producing the visual sensation of looking at an enormous kaleidoscope on the screen. The slide was made of two coloured pieces of glass that rotated symmetrically and inversely and when they crossed each other they generated abstract figures with a strong hypnotic effect. The effect was reinforced by the thickness of the pieces of glass, which produced the optical illusion that the colours were lifting off the screen and left floating in the air.

7th scene. The Royal Polytechnic Institution [45th]

The Royal Polytechnic Institution was a London society devoted to the recreational divulgation of science. Its large assembly hall, 36 and a half metres long and 12 metres wide, with stands on the sides, became very famous for its magic lantern sessions. In 1841, its first sessions were the work of Henry Landon Childe, although the most ambitious period in the programming of lantern shows began in 1854, when Henry Pepper became the director. According to Pepper, the Royal Polytechnic Institution had sessions that used up to seven magic lanterns at a time, besides a good number of accessory devices installed behind the screen to produce sound effects such as thunder or wind.

7th scene. In the service of scientific divulgation [46th]

Converted into one of the technical resources most employed in the recreational divulgation of science, the magic lantern made fashionable a type of spectacle able to 'entertain by instructing and instruct by entertaining'. The collections of scientific slides dealt with all fields of knowledge, such as anatomy, botany, chemistry, geology, medicine, zoology, history, architecture, geography and astronomy. For example, in 1882, after the death of the French lanternist François Moigno, an inventory was made

of the catalogue of views that he used in his shows. The catalogue showed 4,388 magic lantern slides and most of them had to do with scientific divulgation.

7th scene. Science and leisure at home [47th]

The magic lantern had an important educational and recreational function in the private sphere, which is clear from the testimony of the manufacturer Walter B. Woodbury, author of the informative pamphlet 'Science at Home':

> The magic lantern has become, or is rapidly becoming, one of our best private tutors: besides entertaining the little ones, it can be transformed into an instrument for the divulgation of science among our friends, not in the least limited by the collection of photographic or coloured transparencies that we may possess (Woodbury, 1874, p. 2).

8th scene. The lanternist as stage manager [48th]

The work of the lanternist in the age when the magic lantern became institutionalized evolved from mere projectionist to the figure of a stage manager, that is, he was the person in charge of supervising and orchestrating all the aspects related to staging the audiovisual display, bringing together the visual and dramatic resources, and coordinating the professional conduct of all those participating in the session. As representative figures in this role we can highlight Henry Pepper, at the Royal Polytechnic Institution, or the Parisian, Henri Robin.

Figure 8. John Henry Pepper (Crompton, Henry & Herbert, 1986, p. 49)

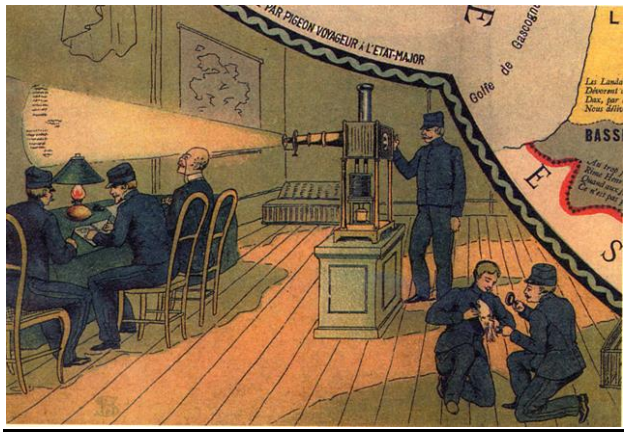
8th scene. Henri Robin's agioscope [49th]

The French lanternist Henri Robin inaugurated his own theatre in Paris on 11 December, 1862. Until the time of its closure in 1868, and based on views painted by Pierre Séguin, Robin offered there a magic lantern show under the name of agioscope. After that, it is estimated that Robin took advantage of his success and took exhibitions all through Europe, as did many professionals of the time.

9th scene. Ever more technical artefacts [50th]

The projection equipment reached a high degree of technological sophistication, above all the equipment addressed to the professional market, an aspect that can be seen when the two lighting systems used to achieve dissolving pictures is described. On the one hand, the highest quality procedure was obtained using an oxhydric lamp whose light intensity could be changed by turning the gas up and down. On the other hand, there were those devices that only used petrol lamps, which were always kept lit, and which were equipped with slits called 'cat eyes'. The technical evolution can also be seen in the microscopic projections of the time.

Figure 9. 1880. Le France à vol d'oiseau - État-major recevant une dépêche (Robinson, 1997, p. 21)



9th scene. Projections of the solar microscope [51st]

In 1757, Jean Antoine Nollet described the solar microscope as "a magic lantern illuminated with sunlight: the microscope slide has no paint; it is simply a piece of white glass, on which a drop of liqueur is placed, and on which there are insects, dust particles, or other transparent corpuscles" (Nollet, 1757, p. 368). In the second half of

the 19th century there was a substantial increase in news items about the surprising spectacles offered based on microscopic projection, as can be seen in one in the Spanish newspaper 'El vigilante cántabro' (May, 1841): "It is the first time that the exhibition of several small insects has been presented, and in my mind I assure you that, concerned with the illusion, I couldn't conceive that a flea could be killed with anything other than a shotgun […], since the little critter looked no smaller than an ox" (Riego, 1998, p. 94).

9th scene. Projections of microphotographs [52nd]

Around 1850, the Englishman John Benjamin Dancer managed to produce microphotographs from fine grain collodion. After this, optical instrument manufacturers such as Jules Dubosq began working to make projection devices capable of exhibiting Dancer's technical achievement. The projections of microphotographs that took place during the Franco-Prussian war (1870 -1872) were famous. A series of messages converted into microphotographs and transported by messenger pigeons served to establish a vital link with the besieged city of Paris. The microscopic messages carrying news of the outside world to the French capital were projected when they arrived and transcribed in order to distribute to the besieged population.

9th scene. Magic lantern slides as works of art [53rd]

Certain magic lantern slides reached the level of art. This can be seen in the list of painters hired to paint the views for the sessions of the Royal Polytechnic Institution: W. R. Hill –linked professionally to Henry Langdon Childe–, Edmund H. Wilkie, Charles Gogin, Thomas Clare and E. H. Doubell. Indeed, when in 1882 the contents of the building were auctioned off in public, the collection of transparencies was one of the most desired lots. Also, illustrators of the stature of Wilhelm Busch or Gustave Doré lent their images to be projected.

9th scene. Printed comic strips as a source of inspiration [54th]

The magic lantern slides made during this time, both by lantern manufacturers and specialized craftsmen, illustrated scenes ranging from great journeys to topics relating to mythology, reproductions of works of art and comic stories. Cartoons printed as comic strips –direct forerunners of comics- were one of the new and principal sources of inspiration and adaptation for magic lantern slides of this time.

9th scene. Format of magic lantern slides [55th]

Given that it refers to the technical and formal aspects of any graphic representation, format gives information about the dynamic and sequential nature of the scenes revealed by magic lantern projection. The typology of magic lantern slides according to format made by Frutos (2007) confirms that the stability of magic lantern slide formats was very high, and that their contents were presented through a mere half dozen stable formal structures of representation. This allowed the spectators to have a relative command of the processes of attention, search and processing, and the manufacturers or lanternists to design and organize their routines and production, distribution and exhibition skills in a stable and standardized way.

9th scene. Magic lantern slides with a linear format [56th]

A magic lantern slide with a linear format showed two or more specific instances of an action, based on one or several layers of glass and/or a metallic slit device that moved lengthwise with respect to the magic lantern lens. All of this was mounted on a wooden base or sheet metal that remained static in the slide tray during projection. The fact that the mechanism that moved - the pieces of glass, slatted shutter or metallic plates- was the only element of the slide that moved, differentiated the linear format from the rectangular format, in which the whole slide tray.

9th scene. Magic lantern slides with a cyclical format [57th]

Magic lantern slides with a cyclical format permitted the images to slide in front of the lens by means of one or several glass discs mounted on wooden or metal bases. The scenes most represented on this type of slide were those that involved a rotating movement, which included objects ranging from windmill or water mill sails to an aquarium, where the fishbowl was represented on a piece of fixed glass, while the fish, swimming in opposite directions, were located on moving discs.

9th scene. Sequencing mechanisms [58th]

Sequencing mechanisms were located in the slide tray slide tray so that even a simple model of magic lantern could be used for sequenced projection. A skilled lanternist

would have to cut the beam of light for an instant in order to slip a consecutive series of isolated images before the lens.

9th scene. Printed magic lantern slides [59th]

The high cost of magic lantern slides that were hand-painted meant that this technique was gradually replaced by printing techniques capable of reproducing images based on a master copy. The printing technique most employed in the manufacture of magic lantern slides was chromolithography or coloured lithography, which consists of using a master copy for each of the colours.

9th scene. Musical compositions devoted to the magic lantern [60th]

Besides the usual musical accompaniment in magic lantern projections, there were many musical compositions whose words contained explicit references to magic lantern shows. For example, the song published in Nantes entitled 'La lanterna magique' describes a boy who shows comic scenes on a magic lantern that projects such improbable images as that of a rich heiress who cannot find a husband or a poor boy who manages to get a loan. (Crangle, Herbert & Robinson, 2001, p. 203).

4ST act. The last decades of splendour (1880-1900) [61st]

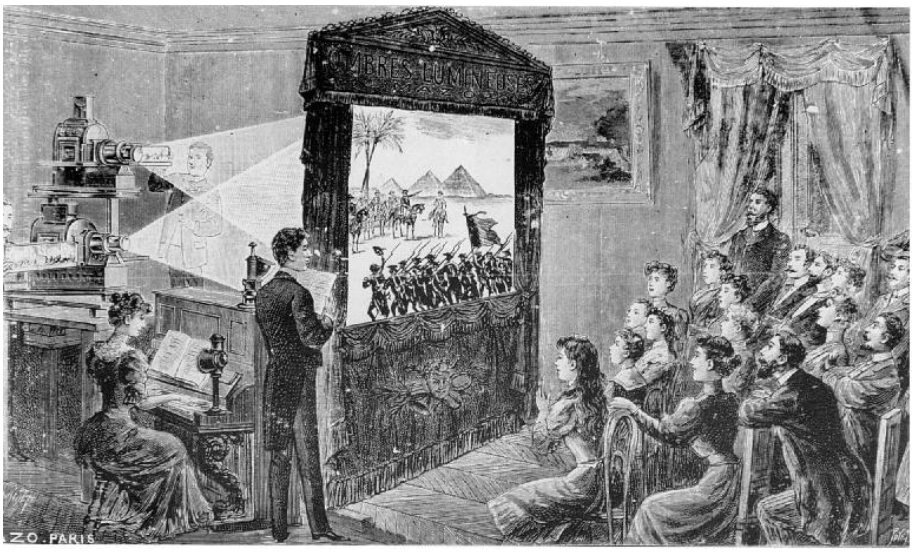
During the final two decades of the 19th century, the magic lantern gave rise to a profitable industry of projection equipment addressed to two well-defined sectors: the domestic sector, which supplied the amateur and children's market, and the professional sector, with products and services addressed to institutions and public spectacles. During the winter of 1895, while Parisians premiered the Cinématographe Lumière, almost fourteen thousand public showings of magic lanterns were being offered in France, not including the sessions organized by educational societies or religious institutions, or home based showings. This demonstrates the importance of these sessions, which were offered in public squares, salons, music-halls, small theatres and cafés.

10th scene. Something for everyone [62nd]

In 1883, four years before he directed and produced some of the pioneering films of

British cinema, Charles Goodwin Norton made a list that showed the broad spectrum of social contexts that were won over by magic lantern sessions. According to Norton, the projection device managed to entertain friends at home, by showing home-made glass slides and illustrating purely scientific lectures. In the context of a public institution, the lantern could also be used for any of their many activities. The magic lantern was also offered as entertainment in different festive spaces and was able to be adapted to their different characteristics.

Figure 10. 1880. Projection manual of the company Mazo (Robinson, 1993, p. 73)



10th scene. A highly competitive market [63rd]

Although there are still no exhaustive lists concerning the European firms devoted to the manufacture of artefacts related to magic lantern sessions, we can offer some information that illustrates their commercial importance. According to the list drawn up by John Barnes and published in *Magic Images* (Magic Lantern Society, 1990, pp. 19-30), in Great Britain during the last three decades of the 19th century there was a total of 112 manufacturers or dealers. In France, Laurent Mannoni (1994) cites more than twenty firms and highlights those of Louis Aubert, the Lapierre brothers and Jules Duboscq. As regards Germany, Ernst Hrabalek (1985) also mentions several dozen brands and the most important firms as those of Ernst Plank, Georg Carette and Johann Falk.

10th scene. Sessions as part of festivities [64th]

Because of their great technical simplicity, magic lantern projections formed part of the repertoire of companies devoted to assembling any kind of public festivity. For example, there were firms such as that of José M. Barreiro, which besides decorating salons for competitions or façades of buildings, offered "parades, dissolving pictures 9 metres high and visible from half a kilometre away, Mongolfier airships and grotesques, giant carnival figures, carnival figures with enormous heads, illuminations, luminous fountains, cascades, fireworks, impalpable shadows, displays, greasy poles,..." (Municipal Archives of Segovia, 21 March 1896).

10th scene. The magic lantern and its teaching applications [65th]

The magic lantern was one of the most useful optical media available to public instruction societies, military academies, and leagues against alcoholism or tuberculosis to complement their courses and lectures in fields of knowledge such as anatomy, botany, history or astronomy.

10th scene. The magic lantern in the private sphere [66th]

The domestic market extended beyond the mere construction of the magic lantern and its slides. For example, the manufacturers also sold short publications that included not only instructions for use but also readings to accompany the audiovisual projections. The French firm Mazo, for example, published a volume entitled *Les narrations*, written to accompany 106 drawn transparencies, approximately 1,086 views in all.

11th scene. The lanternist facing the new challenges of audiovisual spectacles [67th]

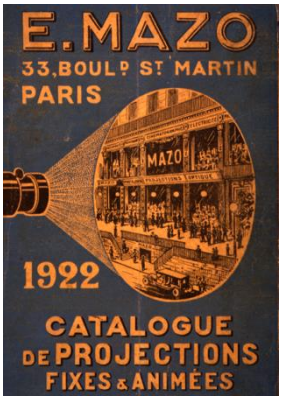
If lanternists had been able to create their own aesthetics for magic lantern sessions, it was now time to apply it to the new challenges that technical progress began to offer the audiovisual spectacle. That is why it is not surprising that many pioneers of the new cinematographic medium had originally been photographers and lanternists. This was the case of Georges Albert Smith or Charles Goodwin Norton in Britain, and the Antonino Sagarmínaga in Spain.

Figure 11. 1890. C. Goodwin Norton (Crompton, Henry & Herbert, 1997, p. 45)

12th scene. A fully developed market for artefacts [68th]

Magic lantern sessions –whether public or private– became the basis of an enormously fertile and highly diversified industrial activity. For this reason the printed sales catalogues describing the equipment offered by manufacturers and suppliers are among the most important sources for the study of the history of the magic lantern. For example, the British firm Newton & Co. published catalogues of more than 1,200 pages –in two volumes– which could list around 200,000 magic lantern slides.

Figure 12. 1922. Catalogue de projections fixes & animées E. Mazo



12th scene. A broad and diversified offer of projection models [69th]

The industrial peak reached by the magic lantern in the last two decades of the 19th century corresponds to the end of a process of simplification and technical improvement of the projection device, a process carried out in a very heterogeneous and competitive market context subjected to a diversified demand, as reflected in the

widespread use of commercial brands. In the magic lantern market, brands applied fundamentally in the projection equipment manufacturing sector, although York & Son, G. W. Wilson and other manufacturers of transparencies protected their views and texts for magic lanterns with commercial brands.

12th scene. Composite models [70th]

The composite models of double or triple projection –also called bi-unial or tri-unial models- were made by connecting two or three devices that could project their beam of light to the same place on the screen, because their projection lenses could be angled to any position desired. The double projection model was the most popular one, whereas the triple projection model was a simple improvement over it, created for more visually sophisticated shows.

12th scene. The cinematographic lantern [71st]

The cinematographic lantern was a curious children's model that combined still and moving images by the straightforward procedure of adding to the magic lantern a simple mechanism for pulling a cyclical band of acetate in 35 mm format with a cartoon on it. The success of the cinematographic lantern was such that it was manufactured well into the 1920s, when it was replaced on the market by the first children's cinemas.

12th scene. Certain short accounts that later became the history of cinema [72nd]

In the early decades of the 19th century, the audience that enjoyed domestic magic lantern sessions was the same one that congregated in the salons of private homes to leaf through magazines, comic strips, or post cards, or to listen to a reading of familiar literature, published in series and duly illustrated with engravings or photographs. It is thus not surprising that when a published strip was successful, it was adapted to magic lantern slides, or vice-versa. This is what happened with a strip by Herman Vogel, published in 1887, in Quantin, showing a boy playing a practical joke on the man watering the park. The short tale passed to the cinema thanks to Louis Lumière and his film 'Le jardinier et le petit espiègle', commonly known as 'L'arroseur arose'.

12th scene. Magic lantern slides with cinematic format [73rd]

In the last two decades of the 19th century, magic lantern slides with cinematic format became very popular among audiences eager for better and better dynamic effects. Composed of one or more discs that could be animated in cyclical form, these plates could be taken off and replaced by others with different images.

12th scene. The Wheel of Life [74th]

The *Wheel of Life* was a famous magic lantern slide created in the image and likeness of a phenakistiscope. The Wheel of Life used a system of gears and cross wires to rotate two discs made with different materials and with different forms: an opaque one made of lightweight iron with a narrow slit, and another made of glass or transparent mica, with the representation of a figure in sixteen different positions of the same movement.

12th scene. The coreutoscope [75th]

The coreutoscope is the magic lantern slide that most precisely projected movement on the screen before the arrival of the cinematograph, and it did so by means of a system of intermittence inspired by the Maltese Cross. Commercialized in two models, disc or band, its limited number of phases barely allowed it to display an action as simple as that in which a skeleton manipulates his own skull, the umpteenth version of the original sketches of Huygens, which in this way again formed part of the repertoire of magic lantern sessions.

12th scene. The cycloidotrope [76th]

The British manufacturer, A. Pumphery, designed a cycloidotrope in 1880. This was a magic lantern slide that could be used both to make discs for chromatoscopes and to show the results by projecting them onto the screen. The device, moved by a crank, engraved cycloidal lines, curves created by the synchronization and adjustment of up to six springs that could be easily manipulated to orientate the needle which lay on the glass, scratching it. The cycloidotrope could trace an infinite variety of geometrical forms on a circular slide of smoked glass.

12th scene. New techniques for making slides [77th]

In the second half of the 19th century, the industrial use of printing and photographic techniques in the making of magic lantern slides relegated hand-painting, the first technique to be employed by craftsmen, to second place.

12th scene. Decals [78th]

A decal was a chromolithograph printed in transparent colours and stuck onto the glass of the slide just by wetting it. It was the printing technique best adapted to the economic interests of the manufacturers of magic lantern products. Starting in 1885, when 3¼ inch (8.25 cm.) square transparencies became the standard of measurement, the popularity of decals for use in magic lanterns increased. For example, in 1892, Theobald & Co. affirmed that it had two million views created with this technique in its stock.

12th scene. Photographic techniques for slides [79th]

Almost all photographic processes of the 19th century were modified to adapt them to printing on glass slides. To reproduce the finest detail, manufacturers of photographic views adopted the wet collodion process, whereas amateur photographers of transparencies used to prefer the gelatine dry plate process, easier to handle and more reasonably priced.

12th scene. Sound effects [80th]

In the closing stages of the 19th century, a new variant of audience participation in magic lantern shows revitalized the musical presence in the sessions: the collections of “natural models” introduced series of slides that illustrated the words to hymns or songs that the audience would sing with authentic passion. In domestic sessions, the use of musical accompaniment was also intensified. In France, the ‘Luciphone’ made by the Lapierrre firm combined the magic lantern and the gramophone. And in Great Britain in 1894, Smith and Harman patented a device that made it possible to synchronize the melody of a music box with the exhibition of images using a magic lantern.

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